

*REMARKS/ARGUMENTS**The Pending Claims*

Claims 1-4, 6, 8-13, and 15-24 are pending. Claims 1-4, 6, and 8-13 are currently being examined and are directed to a magnetic carrier for a biological substance, such as a nucleic acid. Claims 15-24 are currently withdrawn.

Amendments to the Specification and Claims

The specification has been amended to correct a typographical error that appears in the results of Example 4 (page 47, lines 14-20). The value "68.3" should read "63.8." The correct value appears in column 3, row 5, of Table 1 (page 49).

The elements of claims 5 and 7 have been added to claim 1, and claims 5 and 7 have been canceled accordingly. Similarly, the elements of claim 14 have been added to claim 9, and claim 14 has been canceled. Claim 2 has been amended to be dependent on claim 1. Claim 3 has been amended to be consistent with the language of claim 1. In view of the claim cancellations, the dependencies of claims 6, 8, 19, and 21 have been amended. Claims 15-24 have been relabeled as withdrawn.

No new matter has been added by way of these amendments.

Summary of the Office Action

The Examiner has maintained the restriction requirement. Claims 12-14 are objected to as allegedly being written in improper multiply dependent form. Claims 1-4 and 6 have been rejected for obviousness-type double patenting over claims 1, 3, 6, and 7 of U.S. Patent 6,844,426 (Nishiya et al.) (hereinafter "the '426 patent"). Claims 1-6, 9, and 10 are rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent 5,804,357 (Yamanouchi et al.). Claims 1-4, 9, and 11-13 are rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent 4,124,735 (O'Horo). Claims 1-4 are rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent 4,965,007 (Yudelson). Additionally, the Examiner has rejected claims 7, 8, 11, 12, and 14 over Yamanouchi et al. and claim 14 over O'Horo as

allegedly containing obvious subject matter under 35 U.S.C. § 103(a). Reconsideration of this rejection is hereby requested.

Discussion of the Restriction Requirement

The restriction requirement has been maintained, and as a result, the nonelected claims of Group II (i.e., claims 15-18) and Group III (i.e., claims 19-24) have been withdrawn from consideration. According to the Examiner, the nonelected claims of Group II and Group III will be rejoined for consideration upon an indication of allowable subject matter in Group I (i.e., claims 1-14) to the extent that the nonelected claims are written in dependent form or otherwise include all the limitations of an allowed claim of elected Group I. In accordance with the Examiner's remarks, claims 15-24 have been relabeled as withdrawn.

Discussion of the Objection to Claims 12-14

Claims 12-14 are objected to as allegedly being written in improper multiply dependent form. Multiple dependencies were removed from the claims in the "Preliminary Amendment" filed June 27, 2003. Claim 14 has been canceled in this response, and claims 12 and 13 have been shown with the previously filed amendments entered (i.e., in "clean" form). Therefore, Applicants believe that this objection is moot.

Discussion of the Obviousness-Type Double Patenting Rejection

Claims 1-4 and 6 have been rejected for obviousness-type double patenting over claims 1, 3, 6, and 7 of the '426 patent. Amended claim 1 recites that the magnetic carrier is a ferromagnetic iron oxide particle coated with silica. Such a magnetic carrier is not disclosed in the claims of the '426 patent. In contrast, in the claims of the '426 patent, a ferromagnetic iron oxide particle is coated with carbohydrate, which is distinctly different from silica. As such, the subject matter of pending claims 1-4 and 6 is not taught or suggested by the claims of the '426 patent, and the obviousness-type double patenting rejection in view of the '426 patent should be withdrawn.

*Discussion of the Anticipation Rejections**A. Yamanouchi et al.*

Claims 1-6, 9, and 10 allegedly are anticipated by Yamanouchi et al.

Claims 7 and 14 were not subject to the anticipation rejection in view of Yamanouchi et al. The elements of claims 7 and 14 have been added to claims 1 and 9, respectively. All of the remaining pending claims depend (directly or indirectly) on either claim 1 or 9.

Accordingly, the anticipation rejection based on Yamanouchi et al. is moot and should be withdrawn.

B. O'Horo

Claims 1-4, 9, and 11-13 allegedly are anticipated by O'Horo.

Claims 5, 7, and 14 were not subject to the anticipation rejection in view of O'Horo. The elements of claims 5, 7, and 9 have been added to claims 1 (which includes the elements of claims 5 and 7) and 9 (which includes the elements of claim 14). All of the remaining pending claims depend (directly or indirectly) on either claim 1 or 9.

In addition, the Examiner contends that the particle disclosed by O'Horo contains superparamagnetic ferrite crystallites. However, O'Horo does not disclose a *ferromagnetic* iron oxide particle as recited in independent claims 1 and 9 of the present application. The "superparamagnetic" particle is magnetized only when a magnetic field is applied. When the magnetic field is removed, the magnetization of the particle disappears, and the particle becomes paramagnetic. In contrast, the "ferromagnetic" particle of the present invention is magnetized even without application of a magnetic field, and the particle remains magnetized even when the magnetic field is removed. Thus, the particles of O'Horo and the present invention are clearly different from each other in terms of magnetization.

Accordingly, the anticipation rejection based on O'Horo has been overcome and should be withdrawn.

C. Yudelson

Claims 1-4 allegedly are anticipated by Yudelson.

Claims 5 and 7 were not subject to the anticipation rejection in view of Yudelson. The elements of claims 5 and 7 have been added to claim 1, and claims 2-4 depend (directly or indirectly) on claim 1.

Like O'Horo, the particle disclosed by Yudelson is a superparamagnetic particle, and is not a ferromagnetic iron oxide particle. Accordingly, for the same reasons as described in connection with O'Horo, the present invention has novelty over Yudelson.

Applicants also note that the Office's conversion of 50-350 Angstroms disclosed by Yudelson to 0.05-0.35 micron is incorrect since 1 Angstrom is 0.0001 micron (Office Action, page 5, bottom line). Therefore, Yudelson discloses a particle of 50-350 Angstroms, which is 0.005-0.035 micron using the correct conversion. As such, the 0.005-0.035 micron particle of Yudelson is much smaller than that specified in amended claim 1 of the present application.

Accordingly, the anticipation rejection based on Yudelson has been overcome and should be withdrawn.

Discussion of the Obviousness Rejections

A. Yamanouchi et al.

Claims 7, 8, 11, 12, and 14 allegedly are obvious in view of Yamanouchi et al. The Examiner acknowledges that Yamanouchi et al. fails to disclose the exact aspect ratio, silica coating proportion, and aluminum content recited in the pending claims. However, the Examiner asserts that it would have been obvious for one of skill in the art to determine the claimed ranges because the Yamanouchi reference allegedly teaches that magnetic particles can be surface-treated with silica and/or alumina.

Claims 7 and 14 have been canceled. Claims 8, 11, and 12 require that the particle have an aspect ratio of 1.0-1.2. The Examiner concedes that Yamanouchi et al. does not disclose an aspect ratio of 1.0-1.2 (see pages 6-7 of the Office Action). An aspect ratio of

1.0-1.2 for a particle means that the particle is almost spherical. Yamanouchi et al. only discloses an image-forming method on a silver halide light-sensitive material. In such method, a magnetic particle is fixed on a film, and the data is recorded on the particle using a magnetic head and the like. It is particularly important for a magnetic particle in such technical field to have a high coercive force, because the recorded data need to be stored as magnetic information on the particle. To increase the coercive force of the magnetic particle, the shape of the particle needs to be anisotropic. Therefore, making a spherical particle as required by the present invention is completely opposite to the normal development guidance in the technical field of Yamanouchi et al. As a result, upon reading Yamanouchi et al., one of ordinary skill in the art would have been led away from preparing a substantially spherical particle (i.e., a particle with an aspect ratio of 1.0-1.2), as required by the present invention.

In addition, Yamanouchi et al. does not teach or suggest that both the dispersibility of the particle itself in a liquid and the ability to trap a biological substance can be improved by use of a substantially spherical particle. Therefore, the effect of the present invention could not have been expected from the disclosure of Yamanouchi et al. Furthermore, the physical parameters specified in amended independent claims 1 and 9 affect each other to efficiently extract a nucleic acid. To be specific, saturation magnetization controls the collectability of a magnetic carrier (page 10, lines 5-6, of the specification), and coercive force controls flocculation and dispersion of a magnetic carrier during separation of a nucleic acid from the carrier (page 11, lines 15-22, of the specification). These actions and effects could not have been expected from the disclosure of Yamanouchi et al., and, as a result, one of ordinary skill in the art would not have been motivated to modify the disclosure of Yamanouchi et al. in such a way so as to arrive at the present invention.

From the foregoing, the invention of the amended claims 1 and 9 of the present application is not obvious from Yamanouchi.

B. O'Horo

Claim 14 allegedly is obvious in view of O'Horo. Similar to the discussion with regards to Yamanouchi et al., the Examiner asserts that the aspect ratio recited in the claims is obvious in view of O'Horo.

Claim 14 has been canceled, but insomuch as the elements of claim 14 have been added to claim 9, the following discussion pertains to claim 9.

As discussed above, O'Horo does not disclose a *ferromagnetic* iron oxide particle. Applicants maintain that the ferromagnetic particle of the present invention is not obvious based on the disclosure of a superparamagnetic particle by O'Horo. Firstly, whether the magnetic property of a particle is superparamagnetic or ferromagnetic is a basic property of the particle. Without a known special merit, it is not a general practice to change a superparamagnetic particle to a ferromagnetic particle.

Secondly, O'Horo seeks to provide an electrophotographic carrier material (O'Horo, col. 1, lines 5-8). In electrophotography, a homogenous liquid containing particles and a solvent, which is completely free of flocculation, is considered important. For this to be realized, the coercive force needs to be almost zero. A paramagnetic particle, such as a superparamagnetic particle, is utilized to satisfy the requirement. Inevitably, the size of such a superparamagnetic particle should be extremely small, such as about 500 Angstroms (i.e., 0.05 μm ; O'Horo, col. 3, lines 51-59). Thus, O'Horo effectively teaches away from providing a ferromagnetic iron oxide particle with a larger particle size, such as ferromagnetic iron oxide particle which has an average particle size of 0.1-10 μm , as recited in claim 9.

Furthermore, since O'Horo is directed to providing electrophotographic carrier material, O'Horo does not teach or suggest in the least the trapping of a biological substance. Therefore, the disclosure of O'Horo would not have led an ordinarily skilled artisan to consider modifications to the disclosed electrophotographic carrier material so as to provide a ferromagnetic iron oxide particle with both an improved ability to trap a biological substance and an improved dispersibility in a liquid, as provided by the present invention.

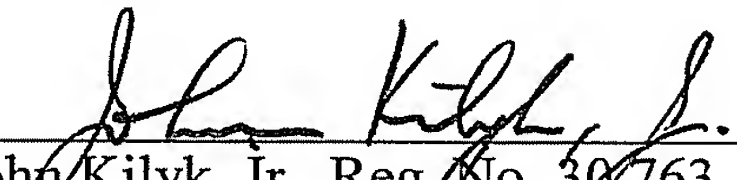
Based on the foregoing, the present invention, as defined by the amended pending claims, is not obvious from O'Horo.

Conclusion

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the

prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,



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Date: January 10, 2007